EPA
United States
Environmental Protection
Agency

TCE Update

Former NAS Moffett Field
Restoration Advisory Board Meeting

November 3, 2011

Dan Stralka
Regional Toxicologist
EPA Region 9

EPA United States Environmental Protection Agency

TCE Update

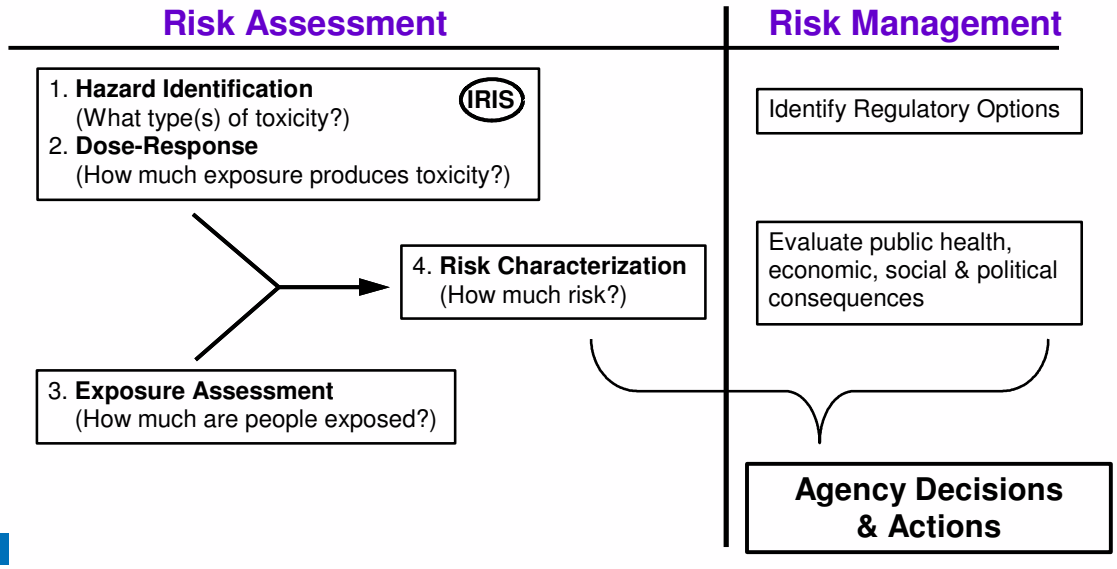
- Significance of TCE at Superfund sites
- EPA drinking water standard for TCE is 5 ppb
- No similar EPA standard for vapor intrusion pathway and indoor air
- Integrated Risk Information System (IRIS) process
- EPA finalized TCE toxicity assessment on September 28, 2011
- EPA TCE Regional Screening Levels and Site-specific MEW/Moffett Field Cleanup Levels

Integrated Risk Information System - IRIS

United States Environmental Protection Agency

Why is IRIS Important?

Risk Assessment and Risk-Based Cleanup Levels (formerly PRGs) now called Regional Screening Levels (RSLs)

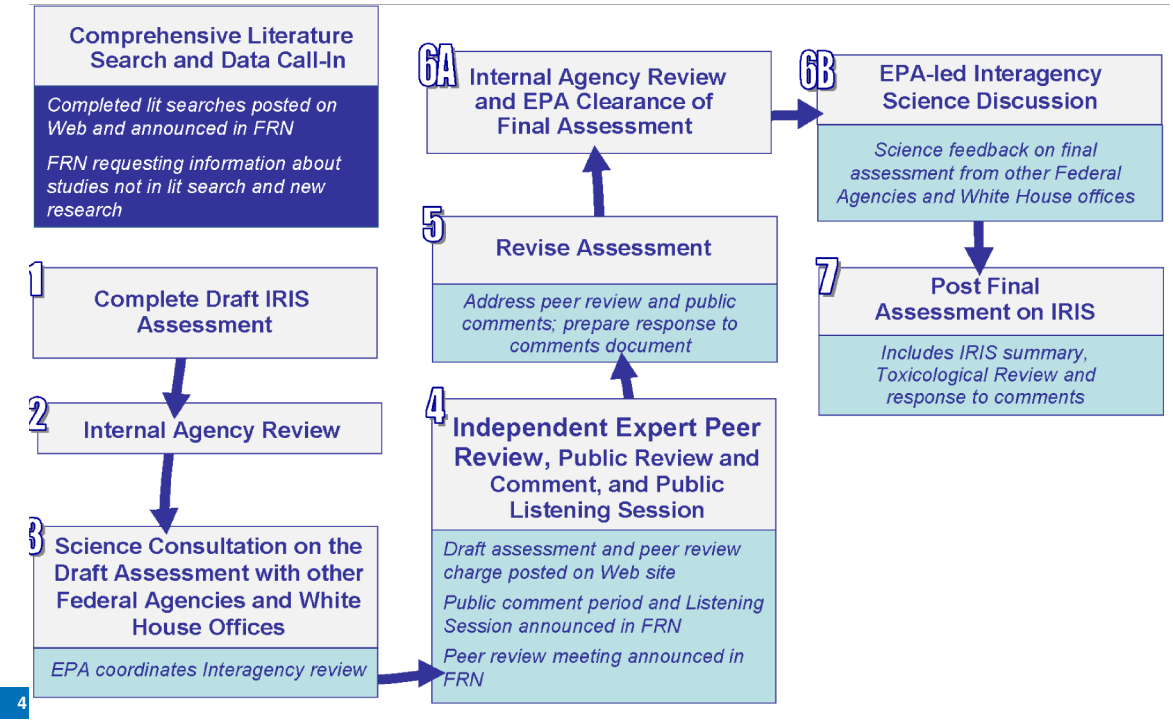


EPA United States Environmental Protection Agency

What is Involved in an IRIS Assessment?

- **Review scientific literature for toxicity data**
  - identify useful (scientifically valid) studies
- **Analyze the relevant data**
  - identify critical studies, toxicities
  - quantitative modeling of dose-response
- **Write a toxicological review**
- **Calculate toxicity values for risk assessment**
  - cancer potency factors
  - non-cancer reference doses
- **Publish on IRIS database**

Current IRIS Development Process



EPA United States Environmental Protection Agency

Hazard Assessment

Health Effects associated with TCE

- **Non-cancer**
  - Acute effects-neurological
  - Various organ systems
    - Liver
    - Kidney
  - **Immunological**
  - Reproductive
  - **Developmental**
- **Cancer**
  - **Kidney**
  - Liver
  - Lymphoma
- **Mode of Action**
  - **Mutagenic (kidney only)**
  - through metabolites

EPA United States Environmental Protection Agency

What's New in the TCE Toxicological Review

- Cancer and Non-cancer toxicity values for both oral and inhalation
- Accounts for multiple sites of cancer
- Mutagenic mode of action for kidney cancer

Key Features of the Final TCE Toxicity Assessment

- **Main Components of 2010 External Review Draft retained**
  - Comprehensive review of studies of TCE and TCE metabolites
  - Toxicity review organized by tissue/system
  - Multiple lines of evidence supporting major conclusions of hazard characterization and dose-response assessment
    - **Human epidemiologic data**
    - **Animal toxicity data**
    - **Mechanistic data**
    - **State-of-the-art quantitative analyses**

Key Features of the Final TCE Toxicity Assessment

- **Implemented virtually all Science Advisory Board recommendations, resulting in:**
  - **Small (< three-fold) changes in non-cancer reference dose and concentration (*RfD and RfC*)**
  - **No change to carcinogenic classification (*e.g., TCE is "carcinogenic to humans"*)**
  - **No change to cancer inhalation unit risk or oral slope factor**
  - **No change to application of Age Dependent Adjustment Factors (*ADAFs*)**

Final TCE Dose Response Assessment: Summary

- **Final Non-cancer Reference Values (RfC and RfD)**

Protective of the most sensitive effects, supported by multiple studies/endpoints:

  - **Most sensitive target organs/systems:** adult immunological system, developing fetal heart, developing immunological system
  - **Supported by kidney effects**

- **Final Cancer Risk Values**
  - **Target sites:** kidney cancer, NHL, and liver cancer
  - **Apply Age Dependent Adjustment Factors** (ADAFs) to kidney cancer risk only

EPA TCE Regional Screening Levels and MEW/Moffett Field Site-specific Cleanup Levels

Current EPA Regional Screening Level (RSL)			Estimated Update to RSL (Nov/Dec 2011)		Current MEW/Moffett Field Cleanup Levels
AIR (µg/m³)	Cancer (1×10^{-6})	Non-cancer	Cancer (1×10^{-6})	Non-cancer	INDOOR AIR (µg/m³)
Residential	1	10	~ 0.5	~ 2	1
Commercial	6	44	~ 3	~ 2 - 9	5
					GROUNDWATER (µg/L)
WATER (micrograms per liter or µg/L)	2	21	~ 1	~ 3	5 (MCL)

EPA United States Environmental Protection Agency

TCE Update: Take Home

- All EPA programs are looking at the new TCE toxicity values will be making the management decisions on how to implement any changes.
- In Superfund, EPA has the Five-Year Review process and will assess impact of any changes that revised TCE toxicity values have on health-based screening, levels, cleanup levels and risk management decisions at each site.

EPA United States Environmental Protection Agency

Questions?

Dan Stralka
Regional Toxicologist
415.972.3048
Stralka.Daniel@epa.gov

For more information on TCE:
http://www.epa.gov/IRIS/ and click on TCE link